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VIA ELECTRONIC CORRESPONDENCE

August 12, 2015

CCN: 59663
File No: 8.DC.20.19 & 82

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
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RE: DOJ No. 90-5-1-1-4022/1
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Attn: Compliance/Enforcement Section
Diane.Pupa@dep.state.fl.us

RE: Consent Decree (Case: No. 1:12-cv-24400-FAM)
Reference DOJ Case No. 90-5-1-1-4022/1
Section VI –Specific Capital Improvement Projects, Paragraph 19(i)
Section XX-Modification
Request for Non-Material Change – CD Project 5.11 - Installation of a 60-Inch Force Main from Kendall Drive to PS 0536

Dear Sir/Madam:

Pursuant to our discussions during our July 16th telephone conference, the Miami-Dade Water and Sewer Department (MDWASD) respectfully requests approval of a non-material change to Appendix D-2, Project 5.11 - Installation of a 60-Inch Force Main from Kendall Drive to PS 0536, in conformance with Section VI.19(i) and XX of the above referenced Consent Decree. Attached for your review and approval is a technical memorandum outlining the requested non-material change to Project 5.11. This tech memo summarizes the presentation made by MDWASD to USEPA and FDEP during our July 16th telephone call.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Should you have any questions regarding this matter, please call me at (786) 552-8571.

Sincerely,

Juan Carlos Arteaga, AIA, NCARB, CBO, APA, LEED® AP
Deputy Director for Regulatory Compliance & Capital Improvements

Attachments: Technical Memorandum -

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To	Daniel J. Edwards, PE
CC	David Haywood, PE, Maricela Fuentes, PE, Franklin A. Torrealba, PE
Subject	CD PROJECT # 5.11, PCTS: 13149 Installation of a 60-Inch Force Main from Kendall Drive to PS 0536
From	Guillermo Regalado, PE / Consent Decree PMCM Team
Date	August 7, 2015
Page	16

Technical Memorandum

1. INTRODUCTION

In accordance with Appendix D of the United States Environmental Protection Agency (USEPA) Consent Decree (CD), Miami-Dade Water and Sewer Department (MDWASD) is required to build a force main along 117th Avenue, from approximately 550 linear feet (LF) south of Kendall Drive (SW 88th Street) to Pump Station PS 0536. A 42-inch force main currently causes a constriction between pump stations PS 0559 and PS 0536. The objective of this project is to reduce the pressure differential (head loss) and increase the flow transfer between the pump stations, eliminating the current constriction. CD Project 5.11 is anticipated to be completed and delivered to MDWASD by May 9, 2018. This Technical Memorandum (TM) summarizes the hydraulic evaluation of the proposed improvements and the performance of the project in the MDWASD Wastewater Collection and Transmission System (WCTS).

The major findings of the analysis, as summarized in this document, are that the 60-inch force main, as defined in the CD, will provide some benefit to the WCTS. However, adding a 48-inch connection to the suction side of PS 0536 will provide similar benefits as those of the proposed 60-inch force main. The ultimate solution to achieve MDWASD objectives in the area of influence of Project 5.11 is Ocean Outfall Legislation Project SP-1 (along with SL-1 and SL-2).

2. EXISTING CONDITIONS

The purpose of the proposed project is to reduce the pressure differential and increase the flow transfer between PS 0559 and PS 0536. PS 0559 and PS 0536, shown in Figure 1, are booster stations that pump wastewater towards the South District Wastewater Treatment Plant (SDWWTP). During large rain events, the headlosses in the force main conveying the discharge flow from PS 0536 (shown in green in Figure 1) cause an increase in pressure along the northern section of the forcemain. The high pressures have an adverse effect on the performance of the connected pump stations. To avoid this condition, MDWASD transfers flow from the suction side of PS 0536 to the suction side of PS 0559 (shown in red in Figure 1). The flow is then conveyed to the SDWWTP through the PS 0559 discharge line (shown in blue in Figure 1). This strategy forces MDWASD to operate more pumps at PS 0559 than at PS 0536, as presented in Figure 2.

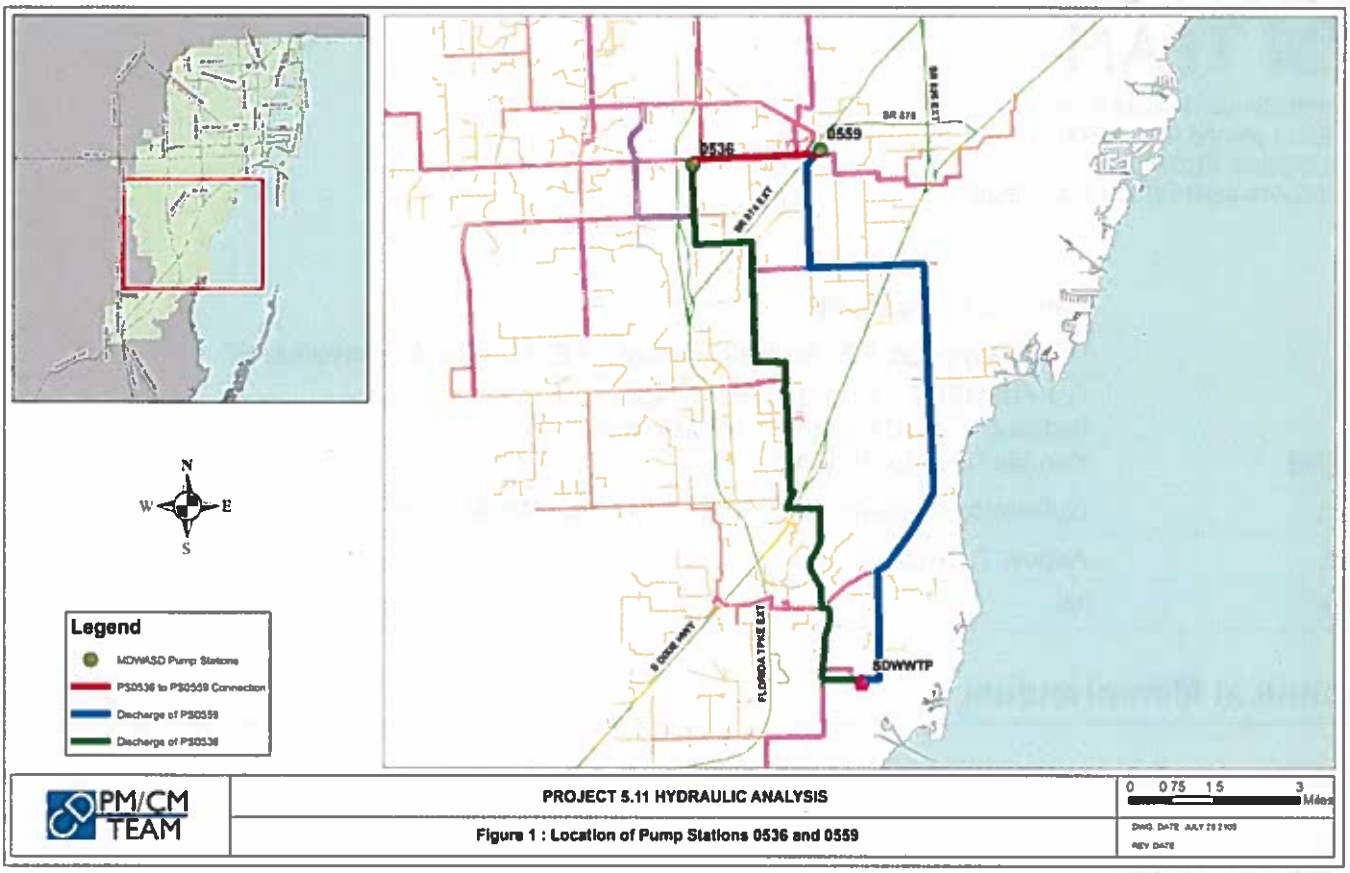

Figure 1 : Location of Pump Stations PS 0536 and PS 0559 and Respective Discharge Lines

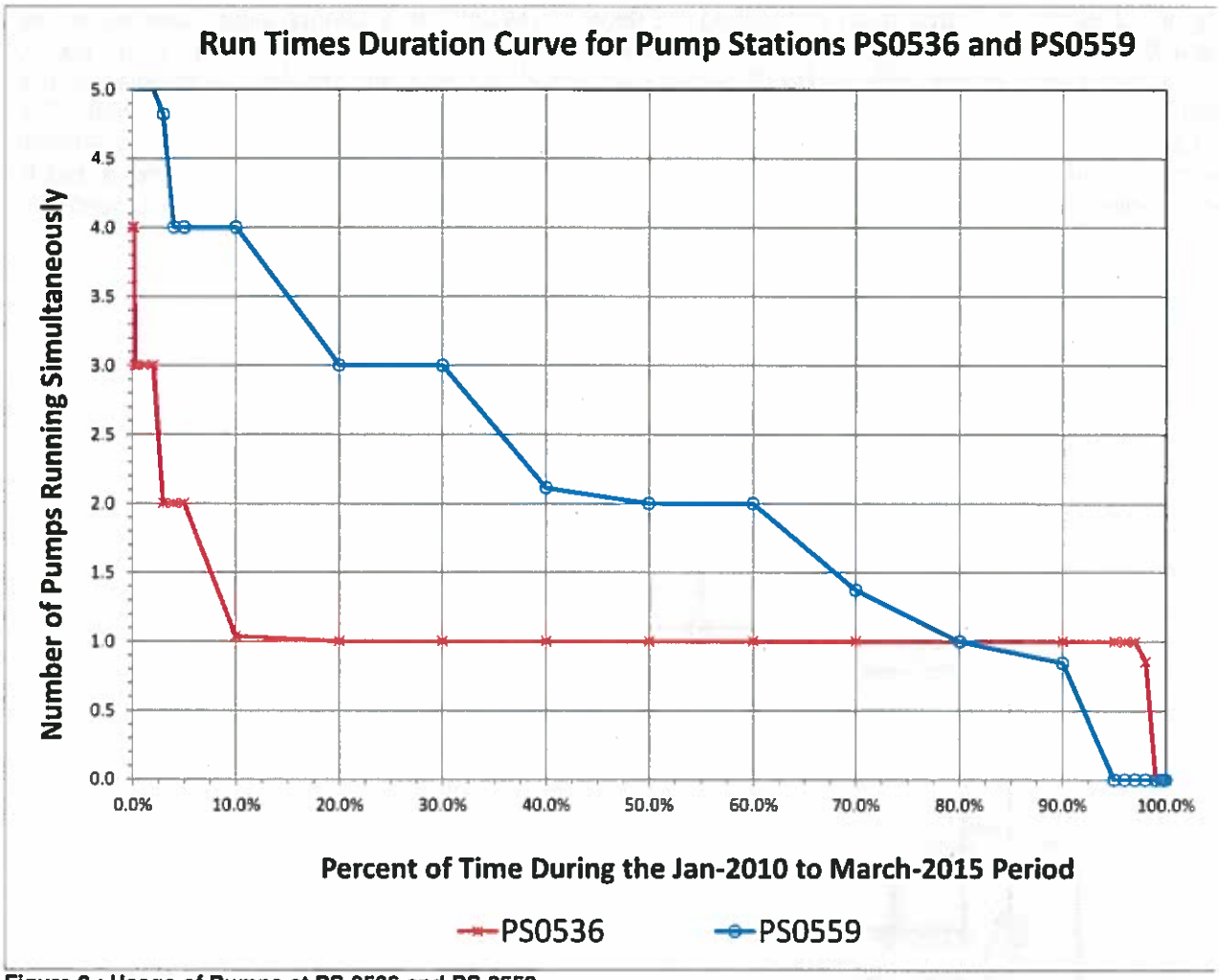

Figure 2 : Usage of Pumps at PS 0536 and PS 0559

For the majority of length the force main connecting PS 0536 to PS 0559 is a 60-inch pipe, however at the western end it is reduced to a 42-inch pipe. Figure 3 depicts the western end of this connection. In this figure, the lines connected to the suction side of PS 0536 are highlighted in green and the lines connected to the discharge side of PS 0536 are highlighted in orange. The 42-inch line shown is considered a constraint. The purpose of CD Project 5.11 is to remove the constraint by replacing the existing 42-inch line with a 60-inch pipe. A 48-inch line parallel to the 42-inch pipe along Kendall Drive, shown in Figure 3, also exists but is currently not connected to either side of PS 0536. This line will be evaluated for use later in this document.

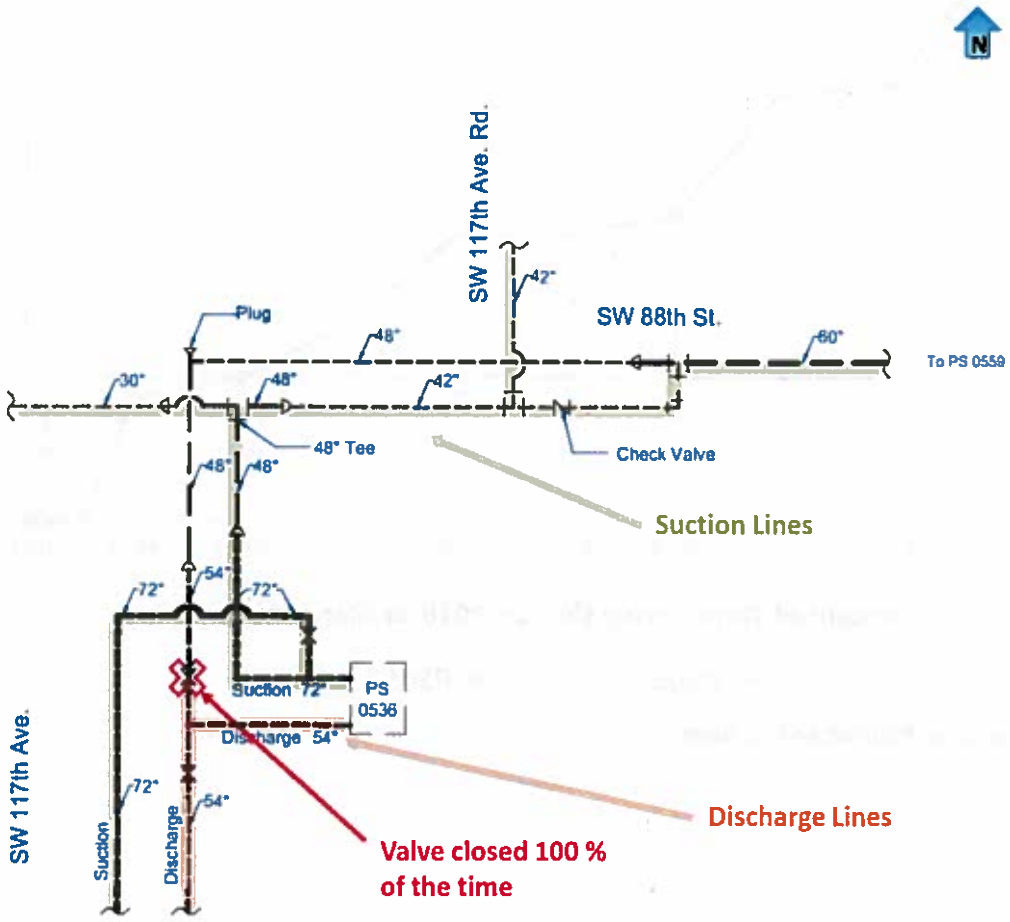

Figure 3 : Existing Configuration at Suction Side of PS 0536

Figure 4 shows a schematic of the connection between PS 0536 and PS 0559. The figure shows the 42-inch constriction. The figure also shows the point of connection for other sources of flow along the line. This information was used to calculate the headloss through the pipe. For the purpose of this calculation, it was assumed that the 42-inch constriction is not in place. Figure 5 shows the headloss through the pipe as a function of flow. The figure shows that headloss through the 60-inch pipe are significant even without the 42-inch constriction in place. The figure also shows that one third of the headloss occurs in the last portion of the force main (Between points 1 and 5, as shown in Figure 4). These results indicate that a different, long-term solution should be implemented to resolve the issues caused by the high pressures at the discharge side of PS 0536.

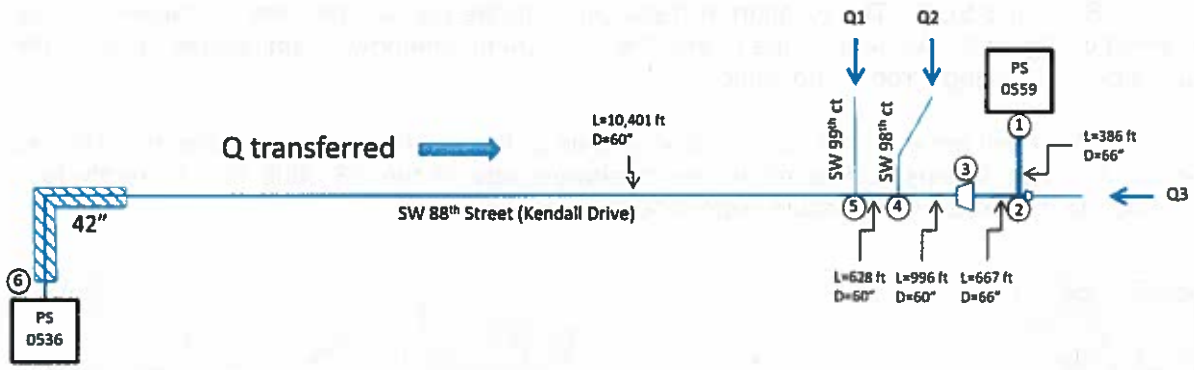

Figure 4 : Schematics of the PS0536 and PS0559 Connection

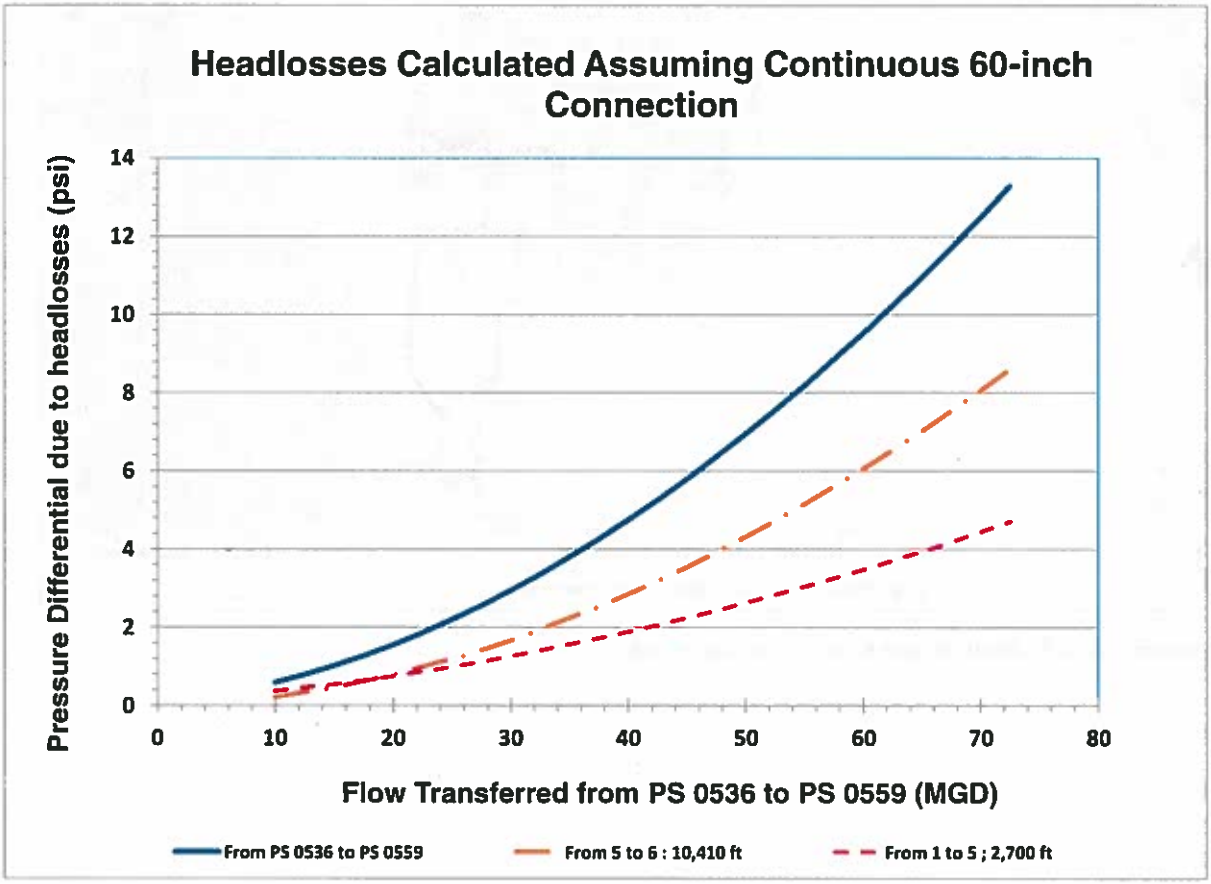

Figure 5 : Head losses along hypothetical 60-inch continuous force main between PS0536 and PS0559

3. PROPOSED LONG-TERM SOLUTION

Pump Stations PS 0536, PS 0559 and PS 0187 serve a large area located in the central part of the County. Figure 6 shows the service areas for the three pump stations. The decrease in performance of PS 0536 operation, imposed by the high pressures along the discharge line, affects a large proportion of this area. For this reason, MDWASD has planned a series of master plan projects that will reduce the wastewater flows that are to be handled by these pump stations. These projects are the proposed Pump Station SP-1 and its

associate force mains: SL-1 and SL-2. The location of these projects, as well as the area of influence of the projects, are presented in Figure 7. As seen in the figure, the SP-1 pump station will considerably reduce the area currently served by the existing three pump stations.

Proposed pump station SP-1 will not only reduce the service area of the existing pump stations, but will also provide direct service to those basins connected to the discharge side of the PS 0536 that currently face discharge problems due to the excessive pressure experienced in that line.

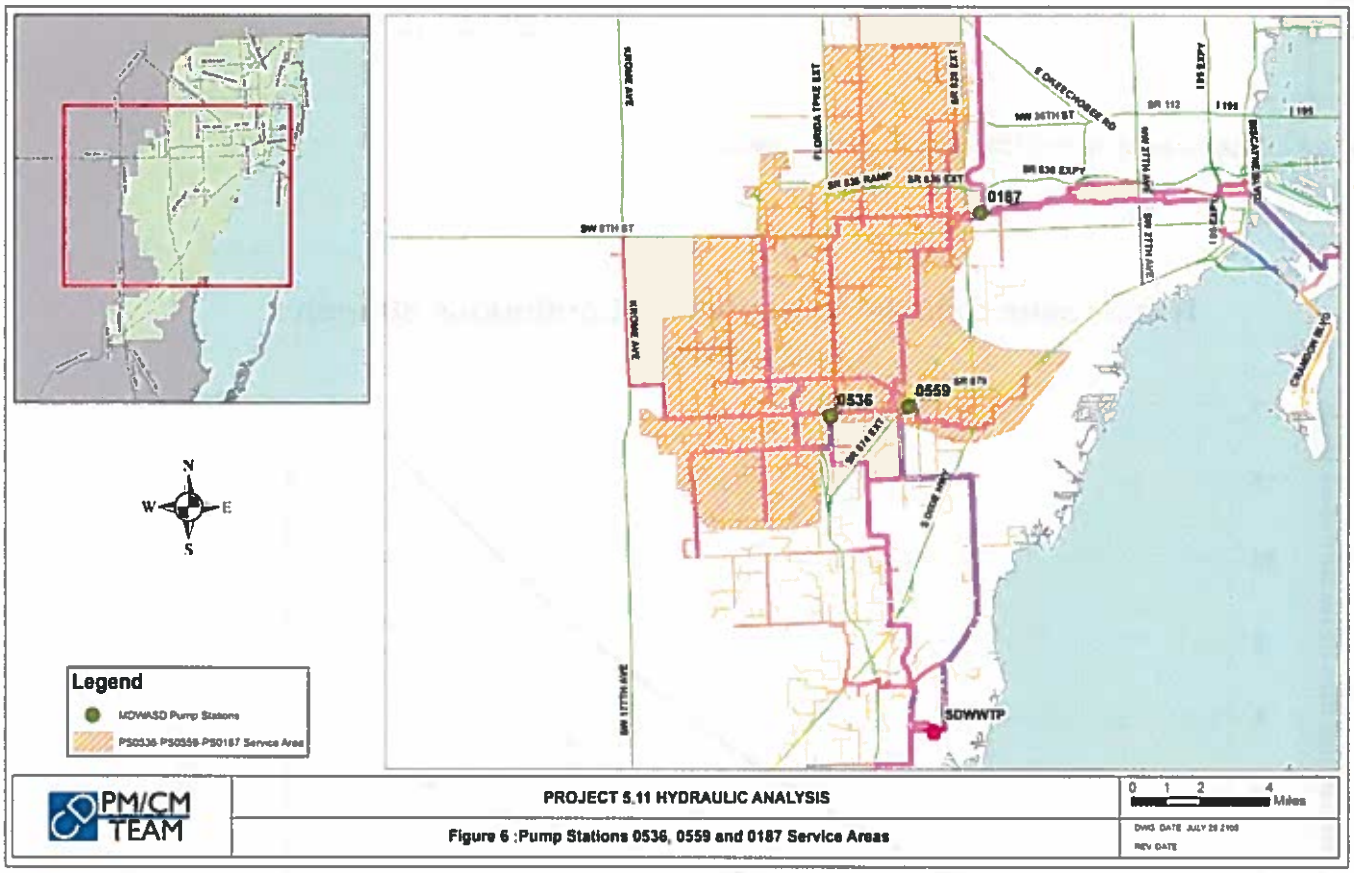

Figure 6 : Pump Stations PS 0536, PS 0559 and PS 0187 Service Areas

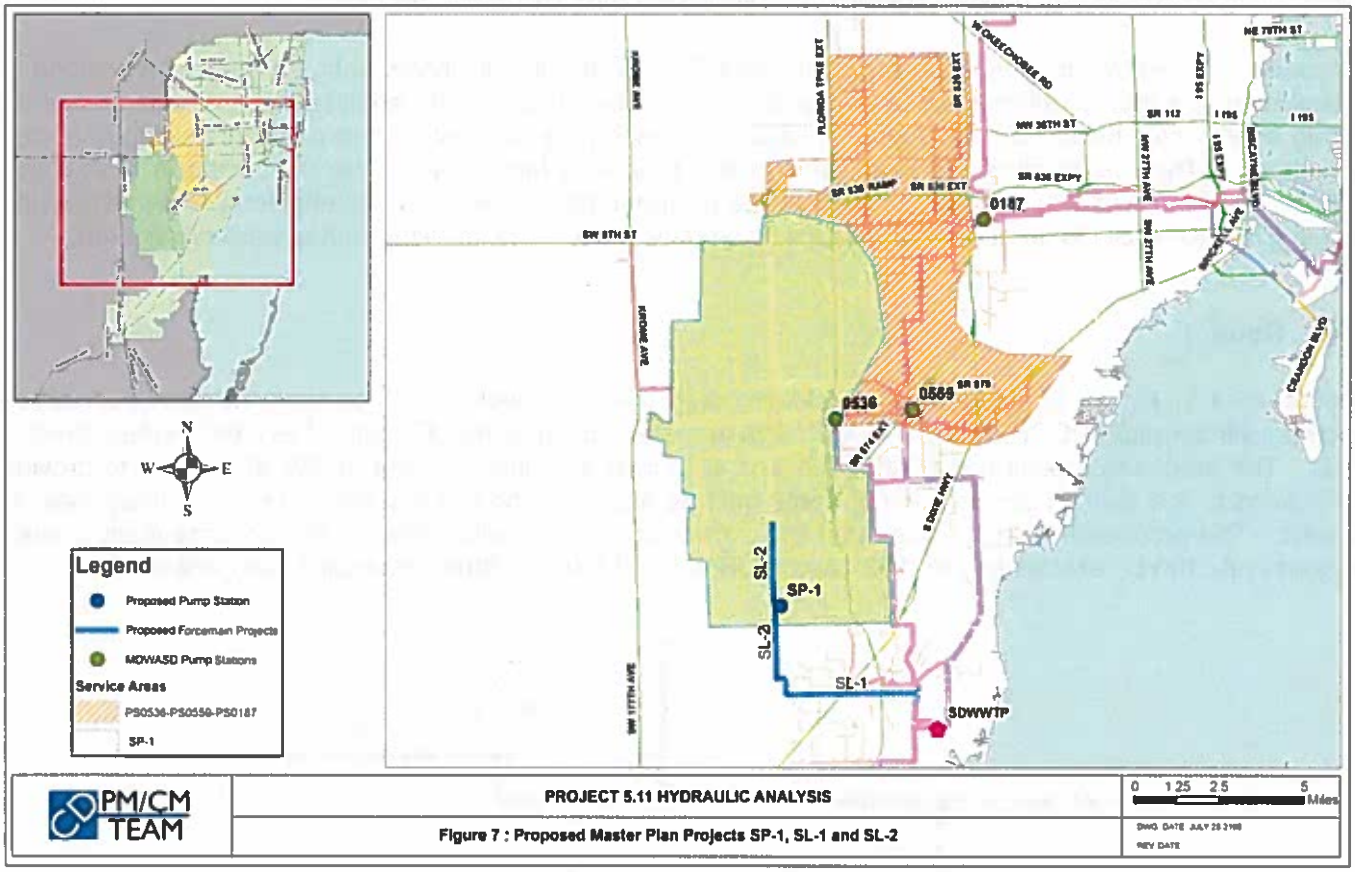

Figure 7 : Proposed Master Plan Projects SP-1, SL-1 and SL-2

4. PROPOSED ROUTE ALTERNATIVES FOR THE CONSENT DECREE PROJECT

To provide the best recommendation for CD Project 5.11 on the interim basis until the long-term solution is implemented, a series of alternatives were considered and evaluated. The analyzed routes were based on existing conditions, current construction techniques, proposed pipe material, and required permitting agencies involvement. The routes allow the installation of the proposed force main to be performed in a sensitive manner. The objective is to minimize impacts to the environment and property stakeholders, while addressing the needs of MDWASD to meet their obligations as a public entity. The following routes were considered.

4.1. Route 1

As presented in Figure 8, the proposed 60-inch force main connects to an existing 72-inch prestressed concrete cylinder pipe (PCCP) along SW 117th Avenue, approximately 60 LF south of SW 88th Street (Kendall Drive). The proposed project has 60-inch tee and a 60-inch x 30-inch reducer at SW 88th Street to provide connections to the 30-inch ductile iron (DI) force main to the west and to the proposed 60-inch force main to the east. The proposed 60-inch force main then connects to an existing 60-inch PCCP force main located approximately 100 LF east of the SW 117th Avenue/Road and SW 88th Street (Kendall Drive) intersection.

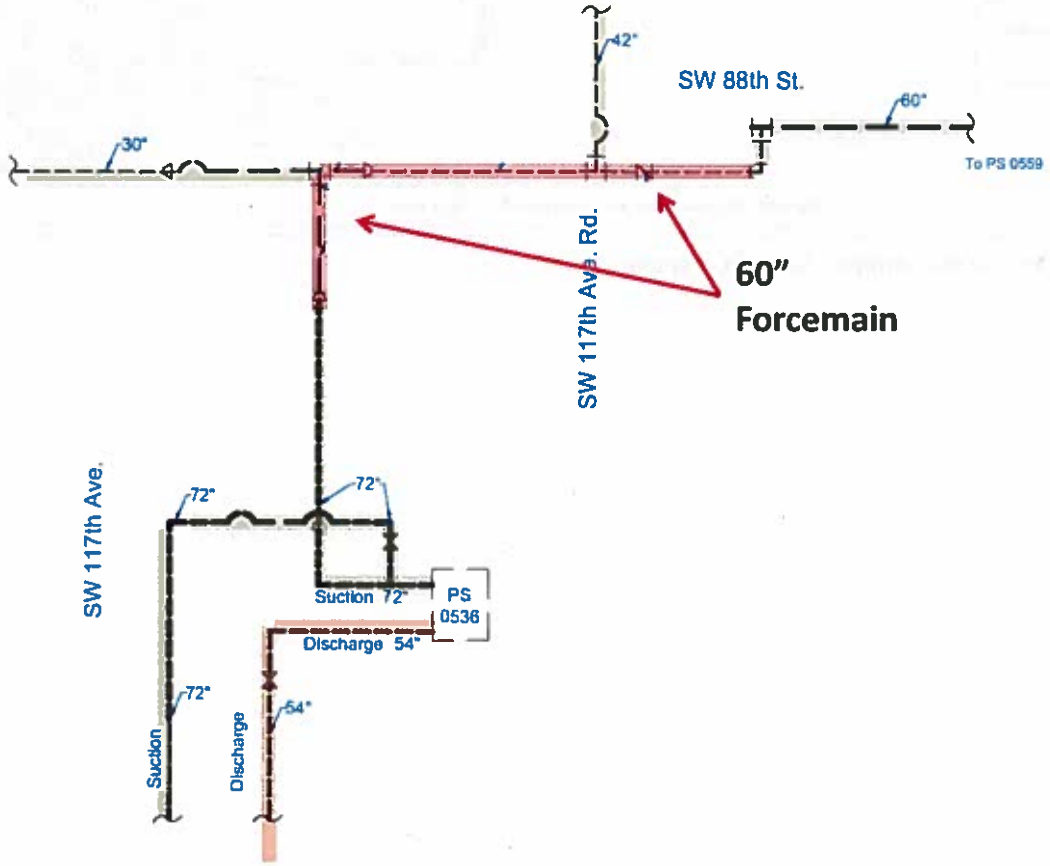

Figure 8 : Proposed Alignment for Route 1

4.2. Route 2

Routes 2 and 3 were proposed as alternatives to Route 1 due to the serious traffic and logistical issues that the project would face along Kendall Drive. As presented in Figure 9, the proposed 48-inch force main connects to an existing 42-inch pipe at SW 79th Street and SW 117th Avenue and runs along SW 79th Street, 114th Avenue, SW 84th Street, and SW 113th Court to where it connects to the existing 60-inch line at SW 88th Street and SW 113th Court.

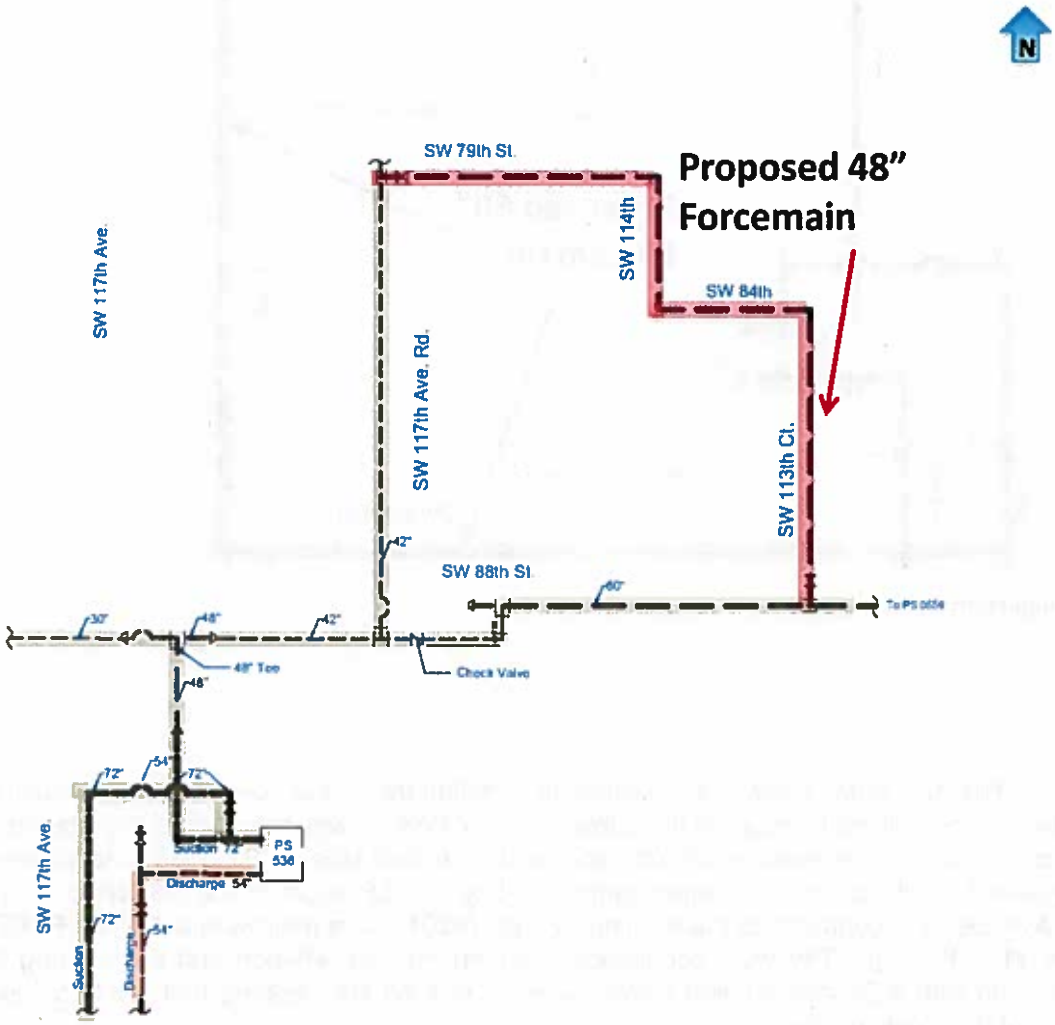

Figure 9 : Proposed Alignment for Route 2

4.3. Route 3

As presented in Figure 10, the proposed 60-inch force main begins at the intersection of SW 117th Avenue and SW 93rd Street from an existing 72-inch PCCP force main (suction line for PS 0536) runs east along SW 93rd Street then turns north and runs along SW 112th Avenue where it connects to an existing 60-inch PCCP force main located at SW 88th Street.

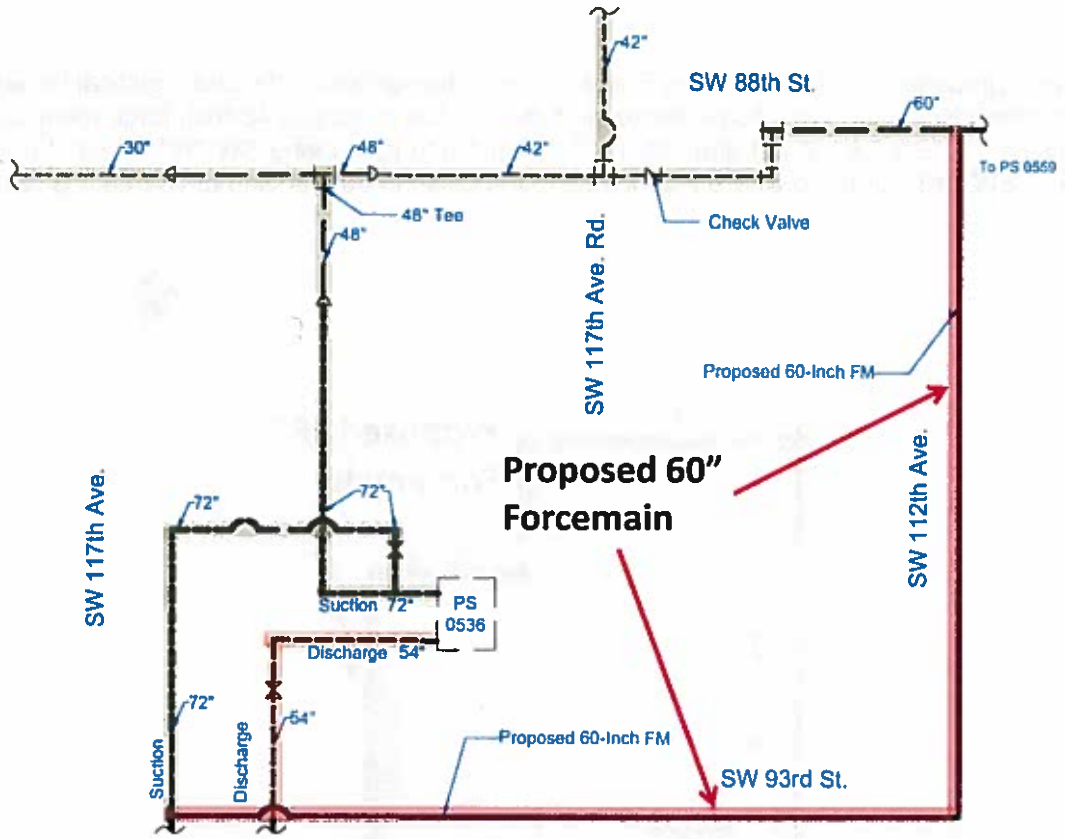

Figure 10 : Proposed Alignment for Route 3

4.4. Route 4

As mentioned earlier in this document, there is an existing 48-inch line that is not connected to the suction side of PS 0536. This line can be utilized to improve the conveyance of flow between the two pump stations. This route involves the connection of the existing 48-inch line to the suction side of PS 0536. As presented in Figure 11, the proposed 48-inch connection begins approximately 100 LF south of the centerline of SW 88th Street on SW 117th Avenue, and connects to the existing 72-inch PCCP force main with a 48-inch PCCP force main (approximately 110 LF long). The west connection between the new 48-inch and the existing 48-inch PCCP force main is done with a 36-inch tapping sleeve to avoid size on size tapping that would compromise the structural integrity of the existing pipe.

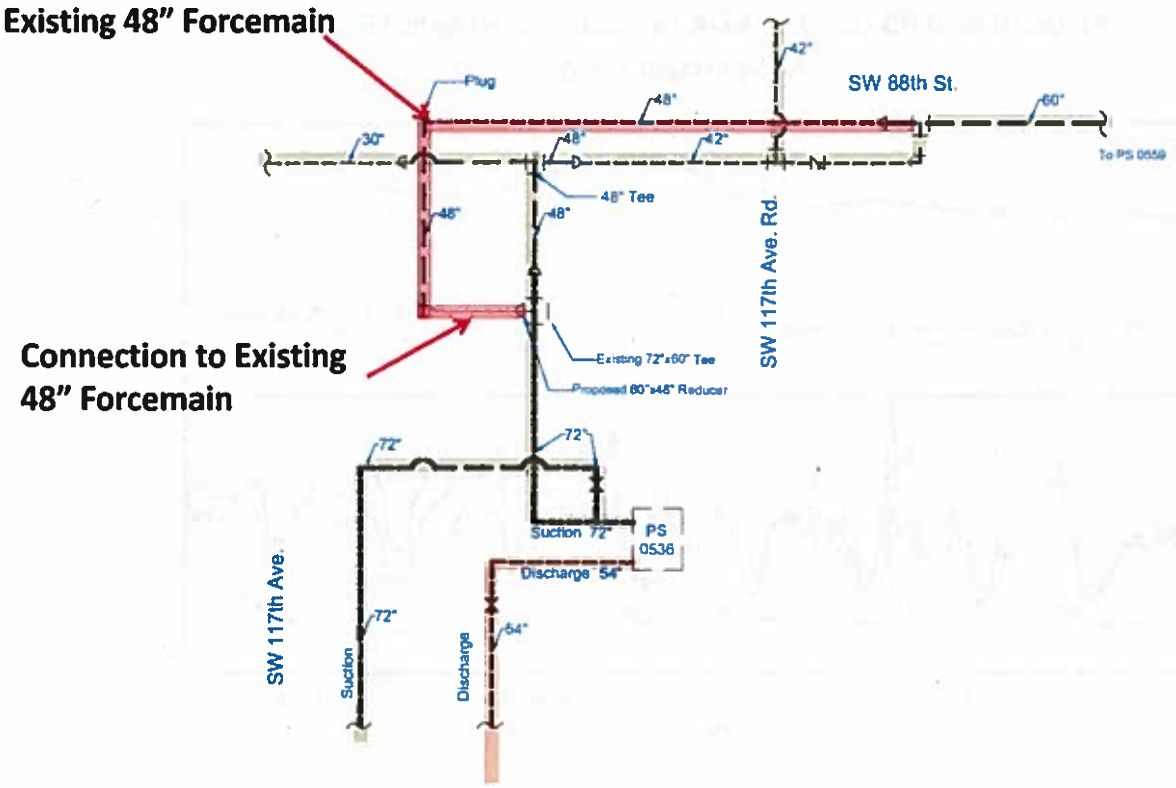

Figure 11 : Proposed Alignment for Route 4

5. HYDRAULIC EVALUATION

To determine the peak flows and discharge pressure for the CD Project 5.11, a hydraulic analysis was performed using the MDWASD Hydraulic Flow Model developed in InfoWorks CS. InfoWorks CS is a hydraulic model capable of simulating both gravity and pressurized flows simultaneously. The model uses Manning's equation to calculate friction losses in the system. A Manning's n range of 0.012 to 0.014 was used for the entire model, with 0.012 used specifically for the proposed project. This model uses inflow hydrographs as the main driver. The performance of the proposed alternatives was evaluated using wastewater flows corresponding to the 2-year storm events. Results of the 2-year storm analysis are summarized in the BODR prepared for this project. However, since the objective of the project was to evaluate the ability of the system to transfer flows from PS 0536 to PS 0559 and this operating condition occurs during medium size storm events but not necessarily during the 2-year storm event, it was required to model a different event to better define the potential benefits of the proposed alternatives. For the analysis presented in this document, a specific event was selected to analyze Project 5.11. The rainfall event of May 17, 2012 was considered for the following reasons:

- Large peak flows and maximum pressures at PS 0536 and PS 0559, as shown in Figure 12.
- Contribution of large peak flows to SDWWTP, as shown in Figure 12.
- Rainfall pattern localized at PS 0536 and PS 0559, as shown in Figure 13.

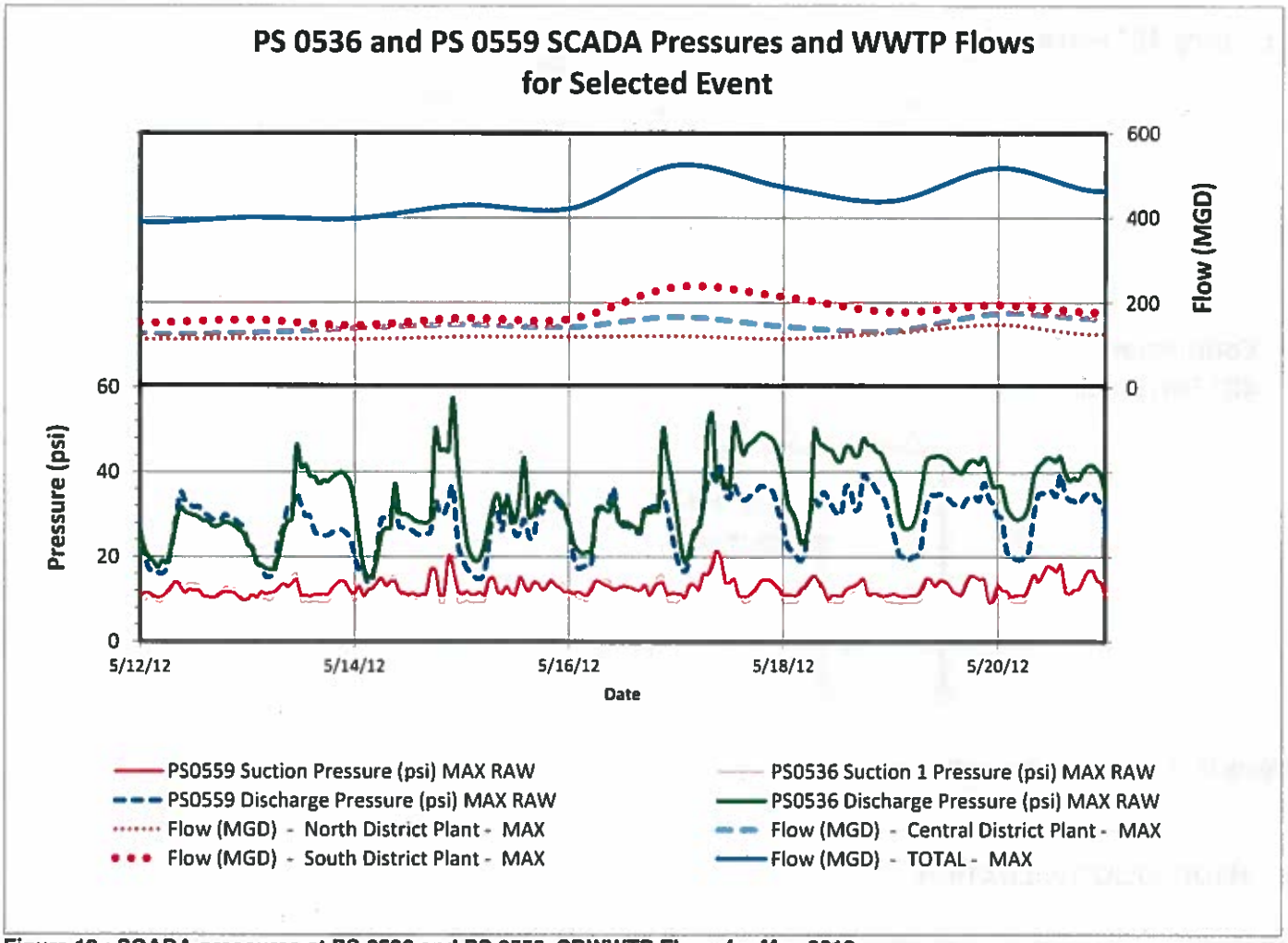

Figure 12 : SCADA pressures at PS 0536 and PS 0559, SDWWTP Flows for May 2012

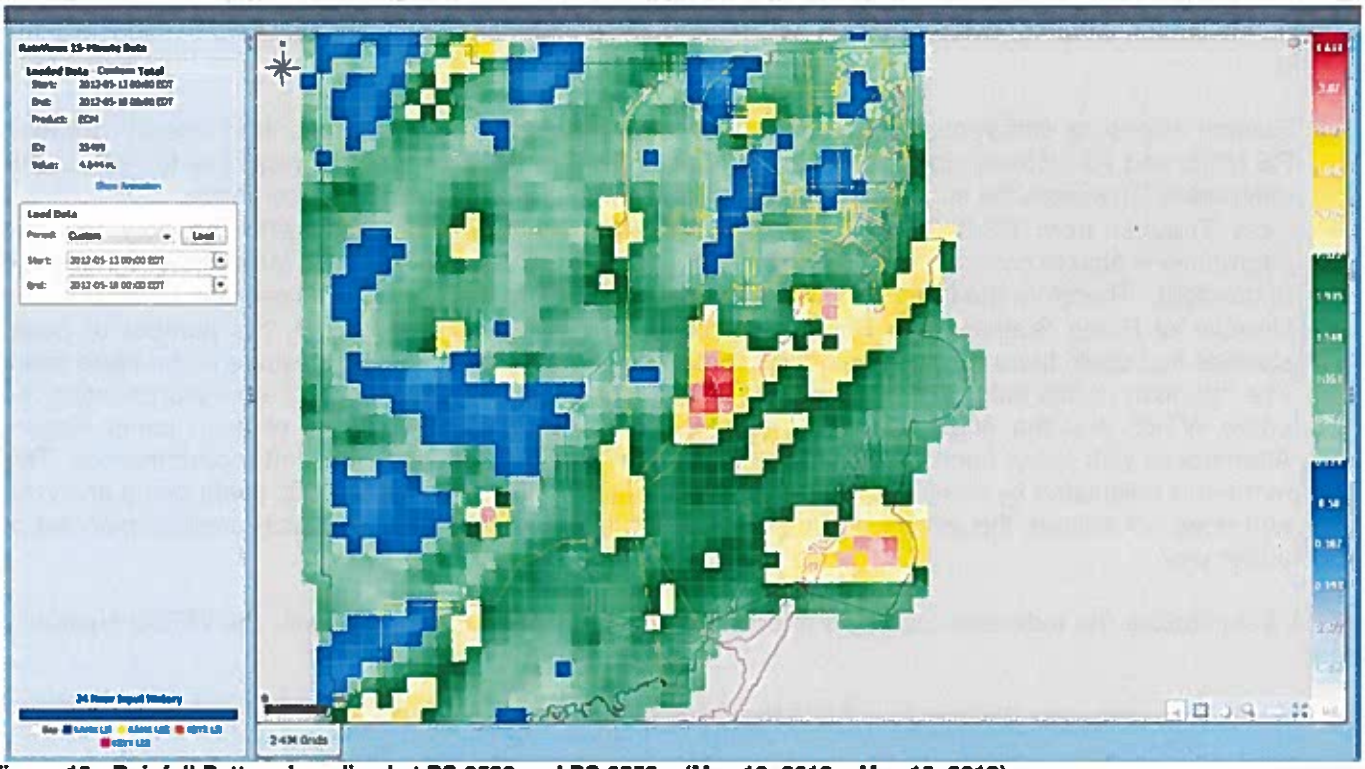

Figure 13 : Rainfall Pattern Localized at PS 0536 and PS 0559 – (May 13, 2012 – May 18, 2012)

5.1. RESULTS

The routes as described above were used to setup modeling scenarios. The scenario results were processed to obtain indicators used to evaluate the performance of the alternatives. The indicators used are the following:

- Suction Pressure Differential (psi): This indicator represents the headloss that occurs between PS 0536 and PS 0559 during the transfer of flow. The intention of the CD project is to reduce this differential. Therefore the smaller this value, the better the performance of the alternative.
- Flow Transfer from PS 0536 and PS 0559 (MGD): This indicator represents the flow that the alternative is able to convey from PS 0536 to PS 0559. The intention is to have larger flows transferred (if needed). Therefore the larger this value, the better the performance of the alternative.
- Number of Pump Stations with Potential Flooding: This indicator represents the number of pump stations that could theoretically face operational issues due to the discharge pressure in the force main. The intention of this indicator is to evaluate the effects of each alternative on the pressures along the entire WTCS and the effect of these pressures on the operating conditions of each pump station. Alternatives with lower number of pump stations with potential flooding have better performance. This number is calculated by evaluating all pump stations in the WCTS for the specific event being analyzed and does not include the effects of the pump station improvement or master plan projects planned or under way.

Table 1 summarizes the indicators obtained after the hydraulic analysis performed with the WTCS Hydraulic Model.

Table 1 : Performance Indicators Obtained from WTCS Hydraulic Model Results

Scenario Description	Suction Pressure Differential (psi)	Flow Transferred from PS0536 to PS0559 (MGD)	Number of Pump Station with Potential Flooding
Existing Conditions	6.5	41.6	171
Long Term Solution (SP-1, SL-1, SL-2)	2.2	24.7*	82
Route 1 – 60-inch along Kendal Drive	5.3	43.8	167
Route 2 – 48-inch force main	6.0	43.8	170
Route 3 – 60-inch longer route along SW 93rd street	5.1	44.5	165
Route 4 – Connection to existing 48-inch line	5.4	43.7	167

As presented in the table, the long-term solution will reduce the pressure differential from 6.5 psi to 2.2 psi. The proposed long-term solution, more importantly, will reduce the number of pump stations with potential flooding from 171 to 82; as compared to the reduction from 171 to 167 achieved with CD Project 5.11. The flow transferred from PS 0536 to PS 0559 for the long-term solution is low because there is no need to transfer flows under that alternative, since most of the flow will be handled by the proposed SP-1 pump station. The reduction in the number of pump stations with potential flooding obtained for Route 4 (connection to existing pipe) is the same number obtained with the original description of the CD Project 5.11.

6. CONCLUSIONS

- Based on the hydraulic evaluation, the pressure differential between stations occurs due to the flows received along the line, in addition to the flows being transferred. The proposed 60-inch force main project has minimum influence on the pressure differential.
- Benefits of the proposed 60-inch pipe as included in the Consent Decree and/or the 48-inch connection are similar, although minimal.
- The long-term solution provided by SP-1 and other projects will eliminate the need to transfer flows from PS 0536 to PS 0559.

7. RECOMMENDATION

The CD PMCM Team recommends moving forward with the 48-inch connection to the suction side of PS 0536, instead of the 60-inch force main initially planned along Kendall Drive.